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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/763,827	01/22/2004	Ching Tong Sim	STL11284	7686
7590	04/06/2006			EXAMINER STAFIRA, MICHAEL PATRICK
Jennifer M. Buenzow Seagate Technology LLC Intellectual Property Dept. - SHK2LG 1280 Disc Drive Shakopee, MN 55379-1863			ART UNIT 2877	PAPER NUMBER
DATE MAILED: 04/06/2006				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/763,827	SIM ET AL.	
	Examiner	Art Unit	
	Michael P. Stafira	2877	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on _____.
- 2a) This action is **FINAL**. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-3,7-10 and 21-24 is/are rejected.
- 7) Claim(s) 4-6 and 11-20 is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on 23 January 2004 is/are: a) accepted or b) objected to by the Examiner. Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a). Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) Notice of References Cited (PTO-892)
- 2) Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 1/23/2004.
- 4) Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) Notice of Informal Patent Application (PTO-152)
- 6) Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1-3, 7-10, 21 are rejected under 35 U.S.C. 102(b) as being anticipated by Sepai et al. ('870).

Claim 1

Sepai et al. ('870) discloses a method by steps comprising comparing electronically a reflected light intensity transition region with a predetermined reflected light intensity transition region threshold to determine compliance of a component (Col. 10-11, lines 49-24).

Claim 2

Sepai et al. ('870) further discloses the component is connected to a printed circuit board assembly, and in which the reflected light intensity transition region is an intensity of light reflected off a meniscus of a solder joint formed between the component and an associated solder pad of the printed circuit board assembly (Col. 7, lines 41-55), wherein the steps further discloses ascertaining a status of the component at a predetermined component site of the printed circuit board assembly; characterizing adherence of the intensity of light reflected off the meniscus to the predetermined light intensity transition region threshold (Col. 11, lines 1-44); and determining compliance of the component connected to the printed circuit board assembly based

on the characterization of the adherence of the intensity of light reflected off the meniscus to the threshold (Col. 11-12, lines 45-39).

Claim 3

Sepai et al. ('870) further discloses the status of the component at the predetermined component site of the printed circuit board assembly is a presence status, wherein the method proceeds to the characterizing step when the component present substantially conforms to a predetermined component footprint (Col. 11-12, lines 45-39).

Claim 7

Sepai et al. ('870) further discloses the status of the component at the predetermined component site of the printed circuit board assembly is a presence status, wherein the method proceeds to the determining step when the component present fails to substantially conform with a predetermined component footprint, wherein the determining step determines the component to be non-compliant and identifies the printed circuit board assembly as a non-compliant printed circuit board assembly (Col. 11-12, lines 45-39).

Claim 8

Sepai et al. ('870) further discloses the status of the component at the predetermined component site of the printed circuit board assembly is a non-presence status, wherein the determining step determines the non-presence status of the component to be compliant and identifies the printed circuit board assembly as a compliant printed circuit board assembly (Col. 11-12, lines 45-39).

Claim 9

Sepai et al. ('870) further discloses the status of the component at the predetermined

component site of the printed circuit board assembly is a non-presence status, wherein the determining step determines the non-presence status of the component to be non-compliant and identifies the printed circuit board assembly as a non-compliant printed circuit board assembly (Col. 11-12, lines 45-39).

Claim 10

Sepai et al. ('870) further discloses the meniscus of the solder joint is characterized as missing by the characterizing step, and in which the determination step determines the missing meniscus to be a non-compliant component and identifies the printed circuit board assembly as a non-compliant printed circuit board assembly (Col. 11-12, lines 45-39).

Claim 21

Sepai et al. ('870) discloses a light source (Fig. 1, Ref. 28) illuminating the component of the printed circuit board assembly (Fig. 1, Ref. 20) as well as the solder joint connecting the component to the printed circuit board assembly (Col. 7, lines 41-55); a processor controlled (Fig. 1, Ref. 46) vision system responsive to the light source (Fig. 1, Ref. 28); an alignment apparatus (Fig. 1, Ref. 14) controlled by a processor (Fig. 1, Ref. 46) supporting the vision system, the alignment apparatus aligning the vision system relative to the solder joint and the component (Col. 7-8, lines 64-38); and decision software programmed (Fig. 1, Ref. 52) into the processor responsive to the vision system determining compliance of the component connected to the printed circuit board assembly based on a shadow projection of the solder joint to determine compliance of the printed circuit board assembly (Col. 11-12, lines 45-39).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claims 22-24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Schimanaski ('912) in view of Sepai et al. ('870).

Claim 22

Schimanaski ('912) discloses a head-disc assembly (Col. 8, lines 65-66); and a compliant printed circuit board assembly (Fig. 1, Ref. 32) attached to the head-disc assembly (Fig. 1, Ref. 46; note: the head-disc assembly is attached to the printed circuit board through electrical connections), compliance of the printed circuit board assembly determined by means for determining compliance of a printed circuit board assembly through steps for determining compliance of a component connected to a printed circuit board assembly (Col. 2-3, lines 48-28).

Claim 23

Schimanaski ('912) substantially teaches the claimed invention except that it does not show a light source illuminating the component of the printed circuit board assembly as well as the solder joint connecting the component to the printed circuit board assembly; a processor controlled vision system responsive to the light source; an alignment apparatus controlled by a processor supporting the vision system, the alignment apparatus aligning the vision system relative to the solder joint and the component; and decision software programmed into the processor responsive to the vision system determining compliance of the component connected

to the printed circuit board assembly based on a shadow projection of the solder joint to determine compliance of the printed circuit board assembly. Sepai et al. ('870) shows that it is known to provide a light source (Fig. 1, Ref. 28) illuminating the component of the printed circuit board assembly (Fig. 1, Ref. 20) as well as the solder joint connecting the component to the printed circuit board assembly (Col. 7, lines 41-55); a processor controlled (Fig. 1, Ref. 46) vision system responsive to the light source (Fig. 1, Ref. 28); an alignment apparatus (Fig. 1, Ref. 14) controlled by a processor (Fig. 1, Ref. 46) supporting the vision system, the alignment apparatus aligning the vision system relative to the solder joint and the component (Col. 7-8, lines 64-38); and decision software programmed (Fig. 1, Ref. 52) into the processor responsive to the vision system determining compliance of the component connected to the printed circuit board assembly based on a shadow projection of the solder joint to determine compliance of the printed circuit board assembly (Col. 11-12, lines 45-39) for an optical inspection apparatus for printed circuit boards. It would have been obvious to combine the device of Schimanaski ('912) with the optical elements listed above with Sepai et al. ('870) for the purpose of providing an optical inspection apparatus that inspects the surface of a printed circuit board, therefore the inspection of defects on the surface which will decrease the amount of printed circuit boards that are have defects from being shipped the end user.

Claim 24

Schimanaski ('912) substantially teaches the claimed invention except that it does not show a component connected to a printed circuit board assembly comprise: ascertaining a status of the component at a predetermined component site of the printed circuit board assembly; comparing electronically a reflected light intensity transition region with a predetermined

reflected light intensity transition region threshold, wherein the reflected light intensity transition region is an intensity of light reflected off a meniscus of a solder joint formed between the component and an associated solder pad of the printed circuit board assembly; characterizing adherence of the intensity of light reflected off the meniscus to the threshold; and determining compliance of the component connected to the printed circuit board assembly based on the characterization of the adherence of the intensity of light reflected off the meniscus to the threshold. Sepai et al. ('870) shows that it is known to provide ascertaining a status of the component at a predetermined component site of the printed circuit board assembly (Col. 10-11, lines 49-24); comparing electronically a reflected light intensity transition region with a predetermined reflected light intensity transition region threshold, wherein the reflected light intensity transition region is an intensity of light reflected off a meniscus of a solder joint formed between the component and an associated solder pad of the printed circuit board assembly (Col. 11-12, lines 45-39)(Col. 7, lines 41-55); characterizing adherence of the intensity of light reflected off the meniscus to the threshold; and determining compliance of the component connected to the printed circuit board assembly based on the characterization of the adherence of the intensity of light reflected off the meniscus to the threshold (Col. 11-12, lines 45-39) for an optical inspection apparatus for printed circuit boards. It would have been obvious to combine the device of Schimanaski ('912) with the optical determination listed above with Sepai et al. ('870) for the purpose of providing an optical inspection apparatus that inspects the surface of a printed circuit board, therefore the inspection of defects on the surface which will decrease the amount of printed circuit boards that are have defects from being shipped the end user.

Allowable Subject Matter

5. Claims 4-6, 11-20 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Michael P. Stafira whose telephone number is 571-272-2430. The examiner can normally be reached on 4/10 Schedule Mon.-Thurs..

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Gregory Toatley can be reached on 571-272-2800 ext. 77. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Michael P. Stafira
Primary Examiner
Art Unit 2877

March 28, 2006